FORWARD SURGICAL TEAM PATTERNS OF INJURY AND CURRENT TREATMENT

Surgical Support for Low-Intensity Conflict, Limited Warfare, and Special Operations

Points to be made

- Scoop and run
- 18 delta corpsman
- Resuscitation
- Damage control or resusatative surgery
- Non-operative rx
- Permissive Hypotension
- Resuscitative or ER Thoracotmy
- Pediatric Trauma
- Mass Casulty
- Body armour
- Blast Injury
- CHI TBI
- Fast
- Hypotensive Resuscitation
- Whole blood
- Torniquets
- Vascular Shunts
- Kwik clot
- Factor 7
- Vascular Access Sternum
- Airways
- Transfusion protocols
- Medevac/Systems improvement

Types of Injury

- Blunt
- Penetrating
- Blast

Main differences from civilian trauma

- High operative rate = about 80%
- No CT scans
- No substances
- High pediatric numbers approx 30%
- High energy transfer, blast or assault weapons
- Limited supplies = blood and oxygen

Main differences from civilian trauma

- High operative rate = about 80%
- No CT scans
- No substances
- High pediatric numbers approx 30%
- High energy transfer, blast or assault weapons
- Limited supplies = blood and oxygen

AFGANISTÁN
MONEDA Y DINERO
MAPA
BANDERA
EL IDIOMA
COSTUMBRES
RECURSOS
NATURALES
Este es la bandera de Afganistan. Los colores de la bandera son rojo, verde, y Negro.
La mayoría de las personas en Afganistán no tienen carro, así que tienen que viajar en los burros.


217


PHANTOM PT
PRT FARAH
NAVY
NAVY


Afghanistan
TURKMENISTAN
TAJIKISTAN
CHINA
IRAN
PAKISTAN
JAMMU AND KASHMIR
To Chardzhou
To Samrkand
To Murgab
To Mary
To Chitral
To Mashhad
To Qayen
To Zahedan
To Quetta
To Dera Ismail Khan
Kelif
Termez
Khorog
Andkhvoy
Rapta
Balkh
Kholm
Feyzabad
Sarhad-i-Wakhan
Buzai Gumbad
Eshkashem
Taloqan
Konduz
Khanabad
Zebak
Mazar-e Sharif
Dowlatabad
Sar-e Pol
Aybak
Baghlan
Pol-e Khomri
Meymaneh
Tokzar
Dowshi
SALANG PASS
Kushka
Bala Morghab
Towraghondi
Rohka
Barikot
Jabal os Saraj
Golbahar
Asadabad
Eslam Qal'eh
Qal'eh-ye Now
Charikar
Bamian
Sarowbi
Chaghcharan
Herat
KABUL
Jalabad
Towr Kham
Peshawar
Ghurian
Shahrak
KYBER PASS
ISLAMABAD
Baraki Barak
Gardez
Ghazni
Shindand
BATAI PASS
Khowst
Kamar
Moqor
Farah
Delaram
Nawah
Wana
Qalat
Gereshk
Kandahar
Lashkar Gah
Chakhansur
Zabol
Zaranj
Hamun-e Saberi
Chaman
KHOJAK PASS
Nushki
Pyandzh
Vakhsh
Pamir
Murghab
Band-i-Amir
Hari Rud
Farah Rud
Helmand
Tarnak
Kabul
Roads
Selected Airfields
Land over 3000 metres
Land over 2000 metres
Land over 1500 metres
Land over 1000 metres
Land above sea level
0 KMS
The Boundaries between the warring factions shown on this map are approximate.
60°
64°
68°
72°
38°
34°
30°N
60°E

Forward Surgical Team Farah,Afghanistan

FST Composition

- 2 General Surgeons
- 1 CT Surgeon
- 1 Ortho Surgeon
- 1 Combat Rheumatologist
- 2 Anesthesia Providers
- 1 OR Nurse, 2 Scrub Techs
- Admin, Supply, Lab

- Forward surgical teams are especially robust, 20-person teams that often are placed in isolated areas to support combat casualty care of SOF soldiers and to provide synergistic care of civilian trauma and disease and so assist, along with 18D medics, in the SOF mission of ‘‘winning the hearts and the minds of the indigenous population.’’


WAR IN AFGHANISTAN
EIGHT YEARS IN AFGHANISTAN
PRES WEIGHS OPTIONS ON IMPORTANT DAY
FOX NEWS


STRANGE
WELCOME
TO
FARAH
AIRFIELD


Operation Enduring Freedom
07
08
FARAH
LOYALTY
TO THE MISSION
HONESTY
AFGHANISTAN
ALONE
AND
UNAFRAID


634

FST Facility


APLS 2883774


1
3


OXYGEN MEDICAL


ALARIS

Atmospherics

- Forward Operating Base Farah was on the border of RC South and RC West, 60 miles from Iranian border
- Main hub for opium transport
- Special Operations and Provincial Reconstruction Team

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Is war good for medicine?

War's medical legacy

By CHRISTOPHER CONNELL

From Thermopylae to Baghdad, from the Gallic wars to Vietnam, war has proved an exacting but efficient schoolmaster for physicians. Hippocrates wrote, "He who would become a surgeon should join an army and follow it." Second-century Greek physician Galen honed his skills not only in the sanctuary of Aesclepius, god of healing, but as physician to the gladiators of Pergamon. The American teenager pried from a twisted wreck on a Friday night and sped to a suburban hospital owes a debt of gratitude to the horse-drawn wagons (known as "flying ambulances") that Dominique Jean Larrey, MD, invented to carry injured soldiers in Napoleon's army and the professional ambulance corps that Jonathan Letterman, MD, instituted for the Army of the Potomac after the disastrous first Battle of Bull Run, where the wounded were left on the field when Union troops fled back to Washington.

Jeffrey Decoster

Gunshot victims wheeled into any big city trauma center benefit from techniques that a generation of EMTs and surgeons first learned repairing combat wounds. "Most of the emergency medical response doctrine in practice in the United States today evolved from medical experiences in the jungles of Southeast Asia in the late 1960s," says Lt. Gen. Kevin Kiley, MD

- “The only people who gain from warfare are young surgeons” – Ambrose Paré

And in the age of process improvement….

- The next seriously injured patient

Points to be made

- JTTS = Joint Theater Trauma System
- Medevac
- Triage
- Data Analysis and Process Improvement
- Clinical Practice Guidelines

The Journal of TRAUMA® Injury, Infection, and Critical Care

Trauma System Development in a Theater of War: Experiences From Operation Iraqi Freedom and Operation Enduring Freedom

Brian J. Eastridge, MD, Donald Jenkins, MD, Stephen Flaherty, MD, Henry Schiller, MD, and John B. Holcomb, MD

Background: Medical lessons learned from Vietnam and previous military conflicts led to the development of civilian trauma systems in the United States. Operation Iraqi Freedom represents the first protracted, large-scale, armed conflict since the advent of civilian trauma systems in which to evaluate a similar paradigm on the battlefield.

Methods: Collaborative efforts between the joint military forces of the United States initiated development of a theater trauma system in May 2004. Formal implementation of the system occurred in November 2004, the collaborative effort of the three Surgeons General of the U.S. military, the United States Army Institute of Surgical Research, and the American College of Surgeons Committee on Trauma. One trauma surgeon (Trauma System Director) and a team of six trauma nurse coordinators were deployed to theater to evaluate trauma system component issues. Demographic, mechanistic, physiologic, diagnostic, therapeutic, and outcome data were gathered for 4,700 injured patients using the Joint Theater Trauma Registry. Interview and survey methods were utilized to evaluate logistic aspects of the system.

Results: System implementation identified more than 30 systemic issues requiring policy development, research, education, evaluation of medical resource allocation, and alterations in clinical care. Among the issues were transfer of casualties from point of injury to the most appropriate level of care, trauma clinical practice guidelines, standard forms, prophylactic antibiotic regimens, morbidity/mortality reporting, on-line medical evacuation regulation, improved data capture for the trauma registry, and implementation of a performance improvement program.

Conclusions: The implementation of a theater trauma system demonstrated numerous opportunities to improve the outcome of soldiers wounded on the battlefield.

Key Words: Battlefield, Combat, System, Trauma, Quality improvement, War.

J Trauma. 2006;61:1366–1373.

Joint Theater Trauma System (JTTS)
Joint Theater Trauma Registry (JTTR)

Information Brief to DHB

14 July 2010

Col George Costanzo
Ms Mary Ann Spott

U.S. Army Institute of Surgical Research (USAISR)
3400 Rawley E. Chambers Ave, Bldg 3611
Ft Sam Houston, TX 78234

What is a Trauma System?

- Organized effort in a geographic region to deliver full range of trauma care
- Improves patient transition between phases of care
- System coordination improves patient outcomes
  - –Reduces mortality by 15 - 20%

Current Route from Injury to Definitive Care

BAS
Level 1

CASEVAC
1 Hour

Forward Surgical Teams
Level 2

INTRA-THEATER AE
1-24 Hours

CSH, AFTH, EMF
Level 3

INTER-THEATER AE
24-72 Hours

Definitive Care
Level 4

72 Hours Plus

CONUS
Level 5

Post Acute Care

VA

JTTS Mission

- Improve organization and delivery of trauma care
- Facilitate Morbidity and Mortality conferences to promote real-time, data-driven **clinical process improvements** and improved outcomes
- Develop and implement **clinical practice guidelines**; monitor compliance with them

Joint Theater Trauma System Clinical Practice Guideline

CENTCOM JTTS CPG DEVELOPMENT, APPROVAL, IMPLEMENTATION AND MONITORING PROCESS

Original Release/Approval		30 Apr 09	Note: This CPG requires an annual review.	
Reviewed:	Mar 2012	Approved:	2 Apr 2012	
Supersedes:	CENTCOM JTTS CPG Development, Approval, Implementation and Monitoring Process, 1 Apr 2010			
☐ Minor Changes *(or)*	☒ ***Changes are substantial and require a thorough reading of this CPG*** *(or)*			
☐ Significant Changes	CPG vetting/approval process updated; PI monitoring plan added			

1. **Goal.** To formalize the processes for developing, reviewing, updating, approving, and monitoring CENTCOM Joint Theater Trauma System (JTTS) Clinical Practice Guidelines (CPGs).

2. **Background.** CENTCOM JTTS CPGs are the backbone of the theater Performance Improvement (PI) program. Historically, since the early outset of the in-theater trauma system, these guidelines have been developed and implemented by clinical subject matter experts (SME) in response to needs identified in the CENTCOM AOR. More recently, as the trauma system has matured, the process for identifying, developing, vetting, approving, and implementing CPGs has also matured. This CPG describes the most current iteration of the process that helps to standardize and codify the spectrum of CPG development and implementation.

   To the greatest extent possible, CENTCOM JTTS CPGs are evidenced-based. Where evidence is lacking or unclear, but a CPG is needed, guidelines are developed based on the best available data and SME consensus. Monitoring of all CPGs is essential to the process, and to this end, each individual CPG will include a system-level PI monitoring plan that will

CPG pertaining to creating CPG's

- 1. Goal: Formalize process of creation and review
- 2. Background: CPG's represent the matured best practices in war surgery. This is how we establish and codify those practices.

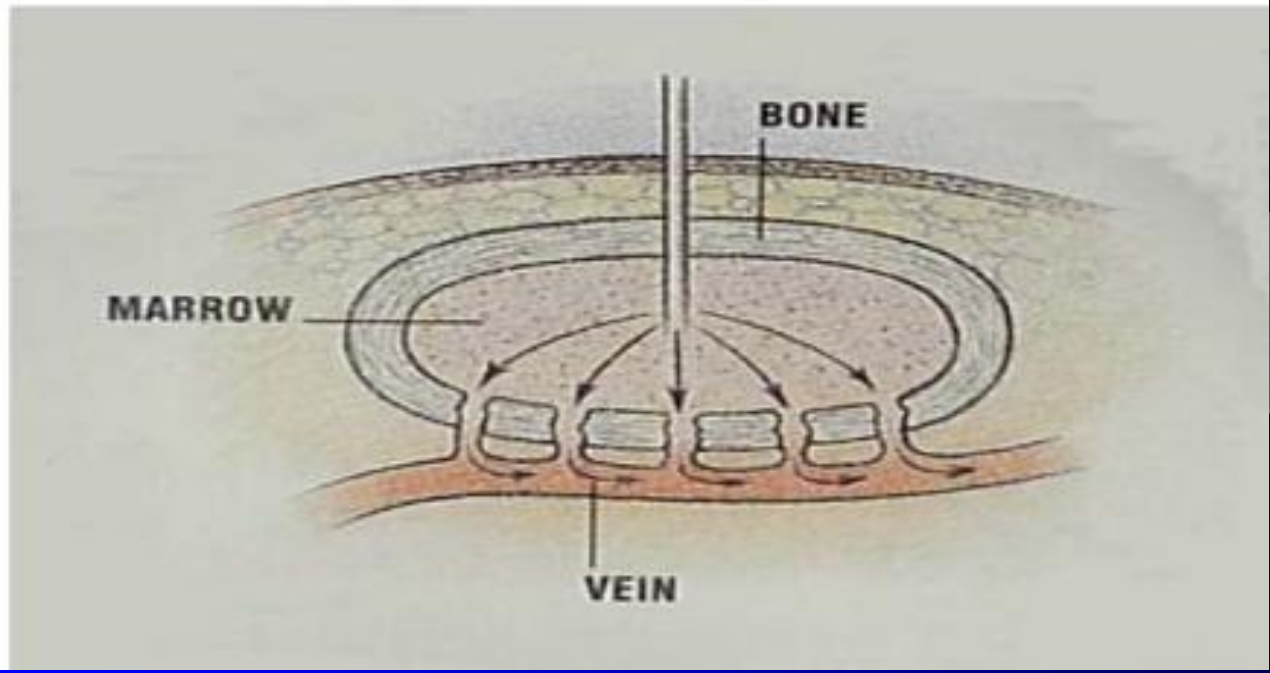
Points to be made

- 18 Delta Corpsmen/Medics
- Airways
- IV access
- Qwik clot
- Tourniquets
- Resuscitation
- Permissive Hypotension
- Resuscitative Thoracotmy


CANNULA
BVM
FACE MASK
RADIAL ARTERY
CATH SET


CANNULA
TRAY
FOLEY
TRAY
CRICKIT
KING
NG TUBE
אמונה
AIRBORNE


H&H Emergency Cricothyrotomy Kit


BONE
MARROW
VEIN


26 F-29 28 cm


HEAT FREE
QuikClot
COMBAT GAUZE
For Temporary External Use
To Control Traumatic Bleeding
ONE STERILE STRIP 3 IN X 4 YDS (7.5 CM X 3.7 M)


NovoSeven®
1.2 mg
1.2 mg (60 KIU)
Powder and solvent for solution for injection
eptacog alfa (activated)
For intravenous, single dose administration
Administration should preferably take place immediately after reconstitution
Read package leaflet before use
Medicinal product subject to medical prescription

That is what is new in airway, IV access and hemostasis

- What about putting fluids back in?

Points to be made

- Resuscitation
- Permissive Hypotension
- Resuscitative Thoracotmy

Resuscitation

- Avoidance of the Deadly Triad
- Whole Blood
- Fresh Frozen Plasma

Deadly Triad

- Coagulopathy
- Acidosis
- Hypothermia

Br J Surg. 2012 Jan;99 Suppl 1:21-8. doi: 10.1002/bjs.7731.

Resuscitative strategies to maintain homeostasis during damage control surgery.

Dutton RP.

Department of Anesthesia and Critical Care, University of Chicago, Room E408, 5841 South Maryland Avenue, Chicago, Illinois 60637, USA. r.dutton@asahq.org

Abstract

BACKGROUND: Successful outcome from damage control surgery (DCS) depends as much on elements of resuscitation and non-operative management as on details of the procedure itself. The early management of patients in haemorrhagic shock has undergone substantial revision in the past decade and is now known as 'haemostatic resuscitation'.

METHODS: An updated literature review describing the anaesthetic and resuscitative management of patients with active, ongoing traumatic haemorrhage was distilled to present the current knowledge of the pathophysiology, recommended treatments and areas of active controversy.

RESULTS: Current practice in military and civilian trauma centres is described, along with the degree of evidence in support of clinical decisions. Resuscitation of patients with ongoing traumatic haemorrhage has changed substantially in the past two decades. Optimal management now includes deliberate hypotension to minimize blood loss, early use of blood products (especially plasma) and administration of antifibrinolytic therapy. Areas of debate include the role of clotting factor concentrates and depth of anaesthesia.

CONCLUSION: Resuscitation strategies during DCS may be as important as the anatomical repair itself. Recommendations include avoidance of hypothermia, maintenance of a lower than normal blood pressure, and early support of the coagulation system in patients likely to require massive transfusion. Controversies include the optimal ratio of plasma to red blood cells for empirical resuscitation, the ideal role of clotting factor concentrates, and the potential benefit of early, deep anaesthesia. Future research will centre on the complex interaction between the humoral elements of coagulation and the vascular endothelium that regulates perfusion, clotting and integrity of the circulation.

PMID: 22441852 [PubMed - indexed for MEDLINE]

What does over-resuscitation cause?

- Dilutional Coagulapathy
- Hypothermia
- Re-bleeding in some instances
- TRALI or other endothelial or immune system phenomeneon

Permissive Hypotension

- Maintain perfusion
- Do not disrupt clot by over resuscitating
- Avoids transfusion and transfusion associated complications

J Trauma. 2007 Jan;62(1):112-9.

Fresh frozen plasma should be given earlier to patients requiring massive transfusion.

Gonzalez EA, Moore FA, Holcomb JB, Miller CC, Kozar RA, Todd SR, Cocanour CS, Balldin BC, McKinley BA.

Department of Surgery, University of Texas Houston Medical School, Houston, Texas, USA.

Abstract

BACKGROUND: Acidosis, hypothermia, and coagulopathy were identified more than 20 years ago as a deadly triad for patients presenting with exsanguinating hemorrhage. This led to fundamental changes in initial management of severely injured patients. Despite major advances, hemorrhage remains a leading cause of early death in trauma patients. Recent studies report most severely injured patients to be coagulopathic at admission, before resuscitation interventions, and that traditional massive transfusion practice grossly underestimates needs. The hypothesis for this study is that our pre-intensive care unit (ICU) massive transfusion (MT) protocol does not adequately correct coagulopathy, and that early uncorrected coagulopathy is predictive of mortality.

METHODS: Data maintained in our Trauma Research Database were reviewed. Univariate logistic regression analysis was used to analyze the association of early ICU international normalized ratio (INR) and outcomes, including survival.

RESULTS: Ninety-seven of 200 patients admitted during 51 months (ending January 2003) and resuscitated using our standardized ICU shock resuscitation protocol received MT (> or =10 units packed red blood cells [PRBC]) during hospital day 1 (age, 39 +/- 2; ISS, 29 +/- 1; survival, 70%.) All patients required emergency operating room and/or interventional radiology procedures and arrived in the ICU 6.8 +/- 0.3 hours after admission. Coagulopathy, present at hospital admission (pre-ICU INR, 1.8 +/- 0.2), persisted at ICU admission (initial ICU INR, 1.6 +/- 0.1). Pre-ICU resuscitation, 9 +/- 1 L crystalloid fluid, 12 +/- 1 units PRBC, 5 +/- 0.4 units fresh frozen plasma (FFP), was consistent with our MT protocol by which FFP was not given until after 6 units PRBC. ICU resuscitation involved 11 +/- 1 L lactated Ringer's solution (LR) and 10 +/- 1 units PRBC. Mean pH was normal within 8 hours. Mean temperature increased from approximately 35 degrees C to >37 degrees C within 4 hours. In the ICU during resuscitation, patients received 10 +/- 1 units FFP for coagulopathy; the ratio of FFP:PRBC was 1:1. Mean INR decreased to 1.4 +/- 0.03 within 8 hours and remained nearly constant for the remaining 16 hours of ICU resuscitation, indicating moderate coagulopathy. Statistical analysis found severity of coagulopathy (INR) at ICU admission associated with survival outcome ($p = 0.02$; area under receiver operator curve [ROC] = 0.71.)

CONCLUSION: These data indicate acidosis and hypothermia to be well managed. Coagulopathy was not corrected in the ICU despite adherence to pre-ICU MT and ICU protocols, likely because of inadequate pre-ICU intervention. More aggressive pre-ICU intervention to correct coagulopathy may be effective in decreasing PRBC requirement during ICU resuscitation, and, because of the association with increased mortality, could improve outcome. We have revised our pre-ICU MT protocol to emphasize early FFP in a FFP:PRBC ratio of 1:1. We think that treatment of coagulopathy can be improved with the development of standardized protocols, both empiric and data driven.


O
Rh POSITIVE

Crit Care Med. 2008 Jul;36(7 Suppl):S340-5.

Warm fresh whole blood transfusion for severe hemorrhage: U.S. military and potential civilian applications.

Spinella PC.

Connecticut Children's Medical Center, Hartford, CT, USA. pspinella@ccmckids.org

Abstract

OBJECTIVE: The objective of this study was to review the history and current literature regarding the benefits and risks of warm fresh whole blood transfusion to include recent U.S. Army research from Afghanistan and Iraq. We also discuss current indications for its use as well as potential civilian applications for large-scale disasters.

BACKGROUND: The use of warm fresh whole blood currently only persists in emergency life-threatening scenarios when tested stored blood components are not available. Recent combat operations in Afghanistan and Iraq have redirected attention on the benefits and risks of warm fresh whole blood for life-threatening injuries in casualties.

MAIN RESULTS: Between March 2003 and July 2007, over 6000 units of warm fresh whole blood have been transfused in Afghanistan and Iraq by U.S. medical providers to patients with life-threatening traumatic injuries with hemorrhage. Preliminary results in approximately 500 patients with massive transfusion indicate that the amount of fresh warm whole blood transfused is independently associated with improved 48-hr and 30-day survival and the amount of stored red blood cells is independently associated with decreased 48-hr and 30-day survival for patients with traumatic injuries that require massive transfusion. Risks of warm fresh whole blood transfusion include the transmission of infectious agents and the potential for microchimerism.

CONCLUSIONS: For patients with life-threatening hemorrhage at risk for massive transfusion, if complete component therapy is not available or not adequately correcting coagulopathy, the risk:benefit ratio of warm fresh whole blood transfusion favors its use. In addition, recent evidence suggests that there is potential for warm fresh whole blood to be more efficacious than stored component therapy that includes stored red blood cells in critically ill patients requiring massive transfusion. Efforts must continue to improve the safety of warm fresh whole blood transfusion for patients when it is required in emergency situations. U.S. civilian disaster agencies are preparing guidelines for its use in massive casualty scenarios and prospective, randomized trials are about to start to determine whether stored warm fresh (<24 hrs) whole blood improves outcomes compared with standard stored component therapy.

PMID: 18594261 [PubMed - indexed for MEDLINE]


Anti-A
Anti-B
Anti-D
Control
Name - Nombre
Address - Dirección
202
B POS
ABO, Rhesus (D)
Date - Fecha
Signature - Firma
Anti-A
Anti-B
Anti-D
Control
Name - Nombre - Nome - Nom - Name - Nev - Navn - Nimi - Namn
208
Address - Dirección - Adress - Adresse - Adressieren - Cim - Adresse - Adressa - Adres
A POS
ABO, Rhesus (D)
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Resuscitative Thoracotomy in Blunt Trauma

- Civilian Dogma = Futile and Potentially Dangerous due to needle sticks and blood borne pathogens.
- Military Setting = All Patients have regular testing for blood borne pathogens.
- Left thoracotomy and occlusion of descending aorta


Open
View 1
View 2
Multi
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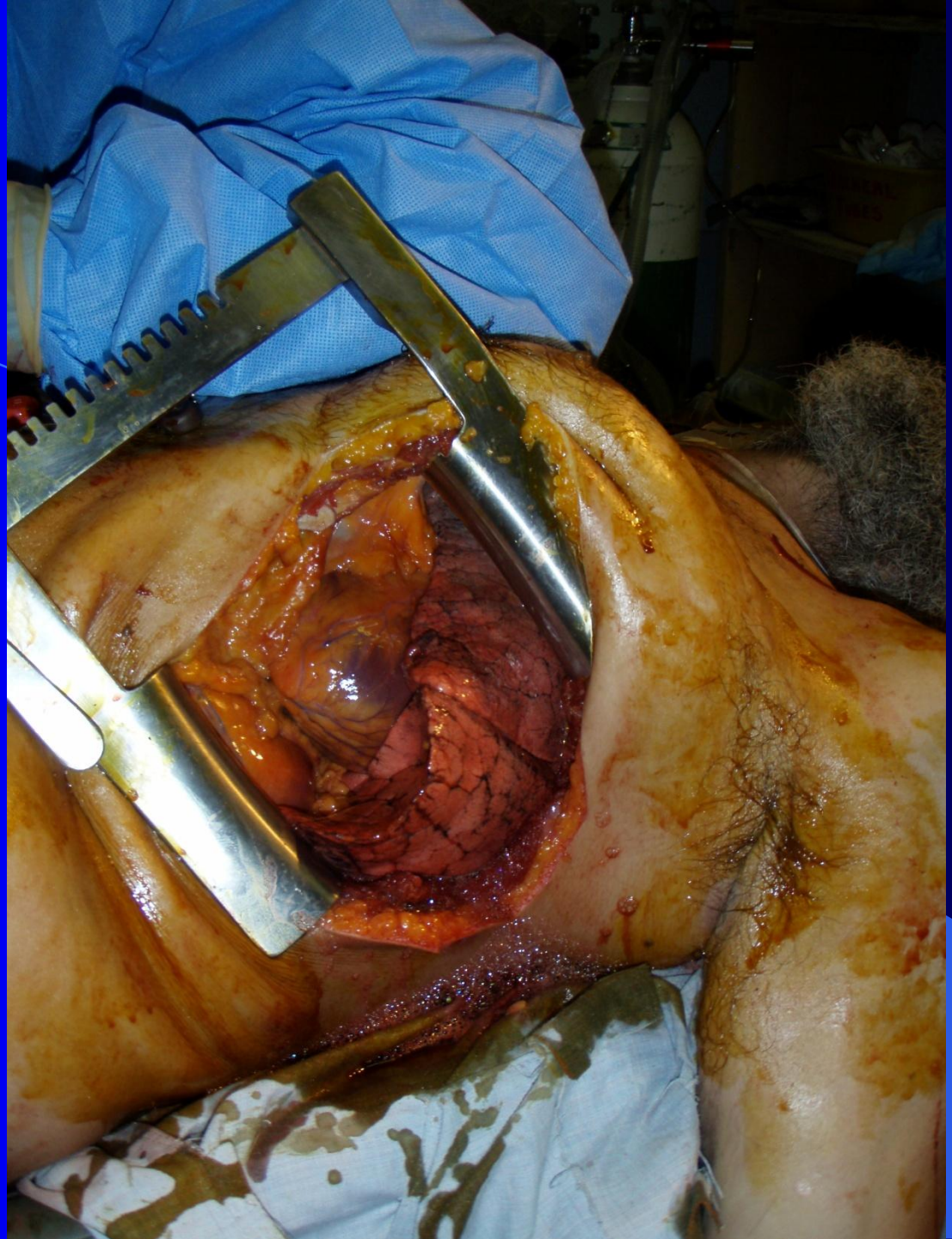
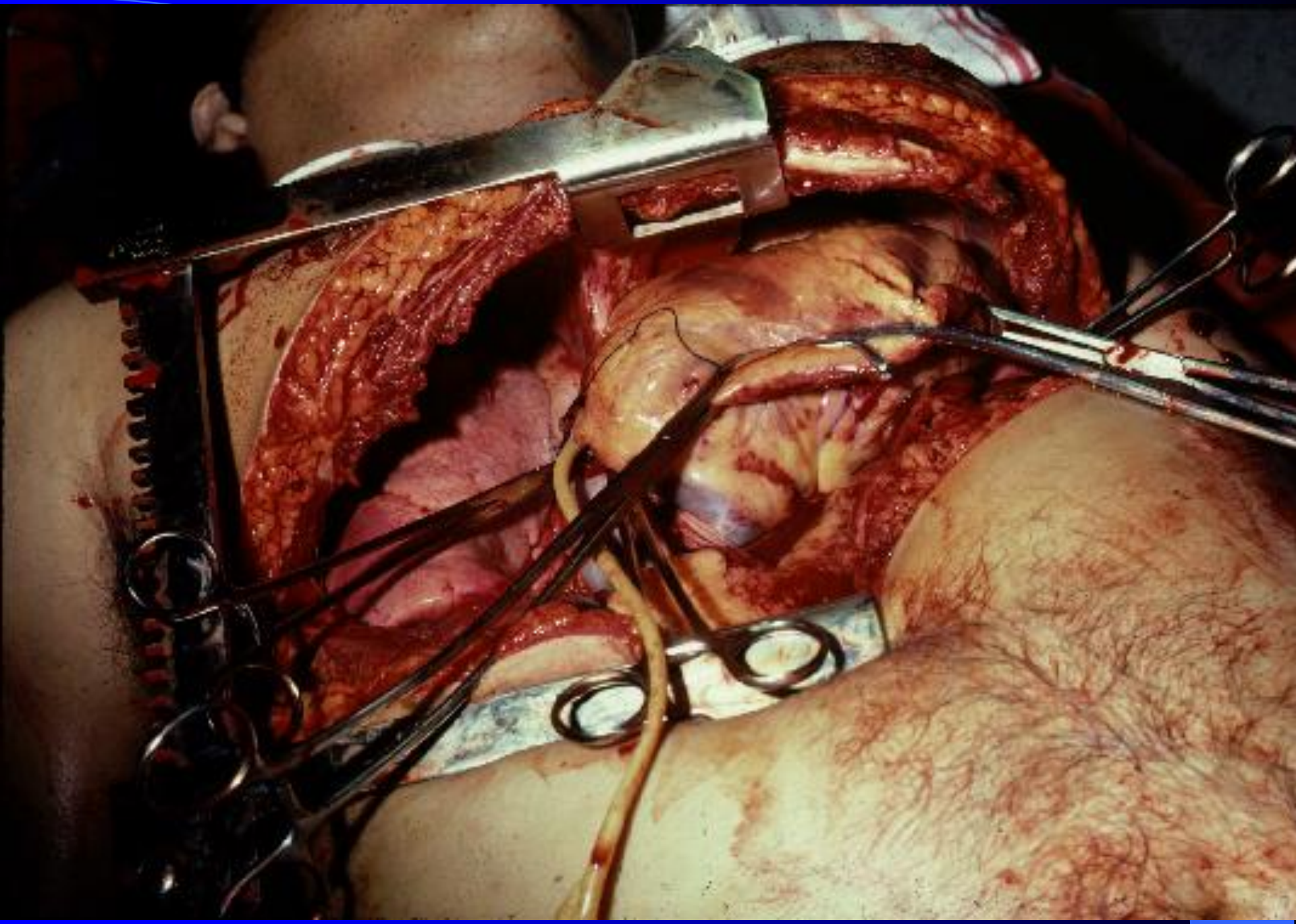
Date: 9/22/2009 11:53:55 AM
Patient: 0142 - 0142,0142
Series ID: 10096100





What is new in blunt trauma?

- FAST exam vs anyother imaging in unstable patient.
- Head trauma treatment/CHI/TBI
- Non-operative treatment of solid organ injury

Joint Theater Trauma System Clinical Practice Guideline

BLUNT ABDOMINAL TRAUMA

Original Release/Approval		18 Dec 2004	Note: This CPG requires an annual review.	
Reviewed:	Jun 2010	Approved:	30 Jun 2010	
Supersedes:	Blunt Abdominal Trauma, 7 Nov 08			
☐ Minor Changes *(or)*	☒ *Changes are substantial and require a thorough reading of this CPG* *(or)*			
☐ Significant Changes				

1. Goal. To provide guidance on the management of combat casualties who sustain blunt abdominal trauma (BAT).

2. Background.

a. Unlike penetrating abdominal injuries where the decision to operate is relatively straight forward, those combat casualties that sustain blunt abdominal trauma offer more of a diagnostic and clinical challenge. With the improvements in body armor, truncal injury has decreased despite increasingly more lethal weapon systems. With the advent of Improvised Explosive Devices (IEDs), however, more casualties are presenting with evidence of BAT. While CT scans are available to assist the provider in decision making at a Level III facility, providers at far forward surgical units must decide to operate based on physical and Focused Abdominal Sonography in Trauma (FAST) exams.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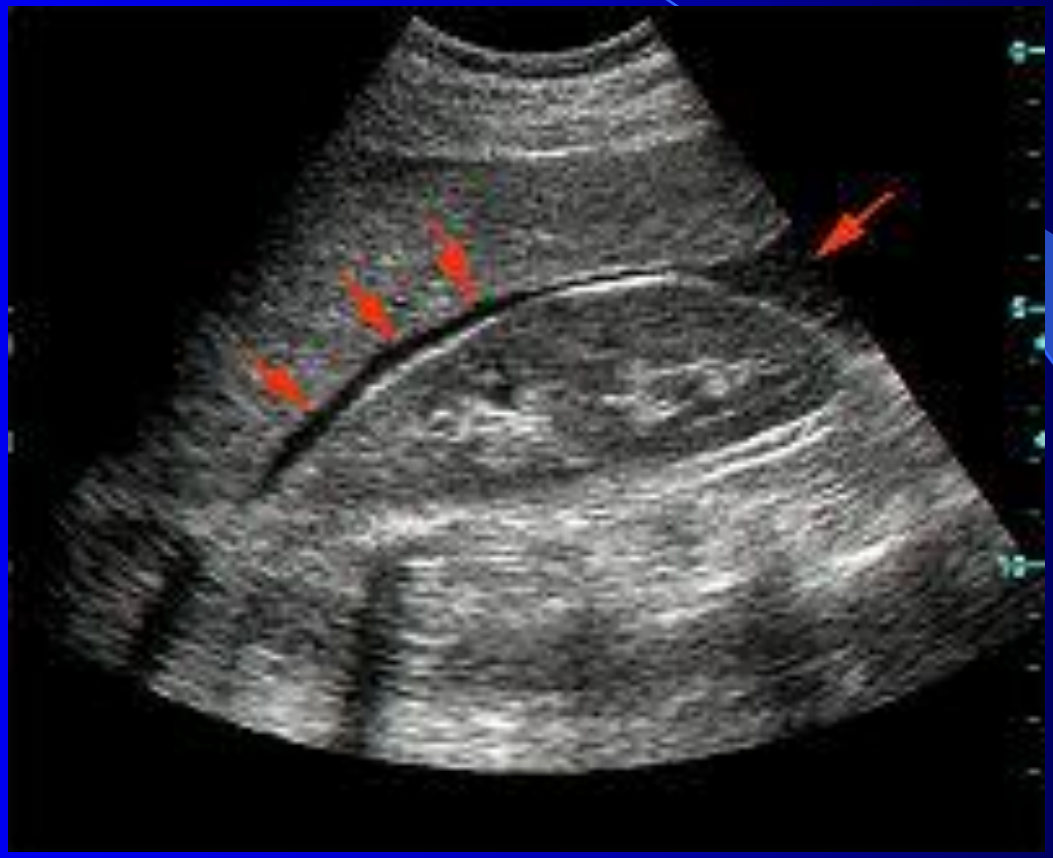
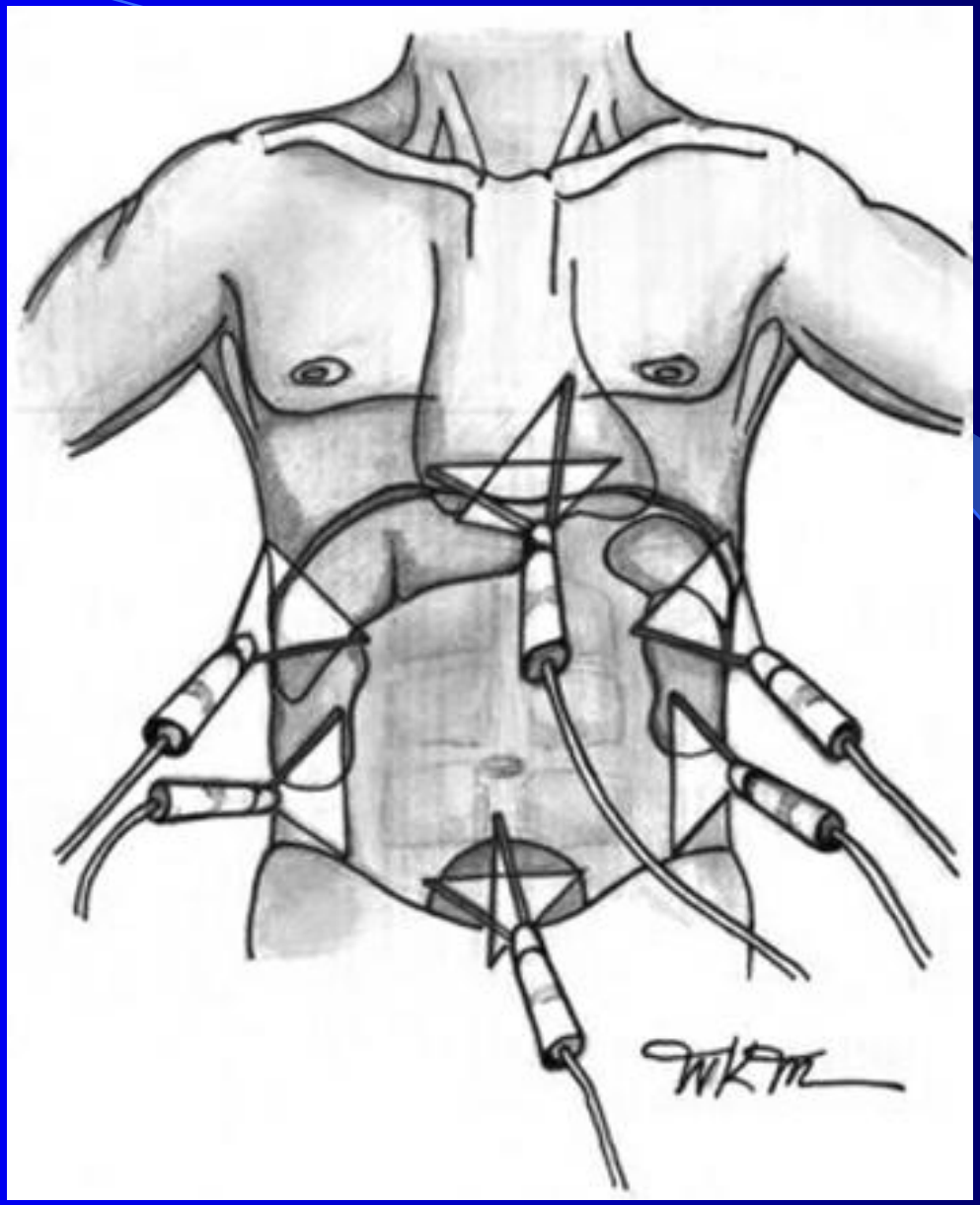
3


SonoSite






FST
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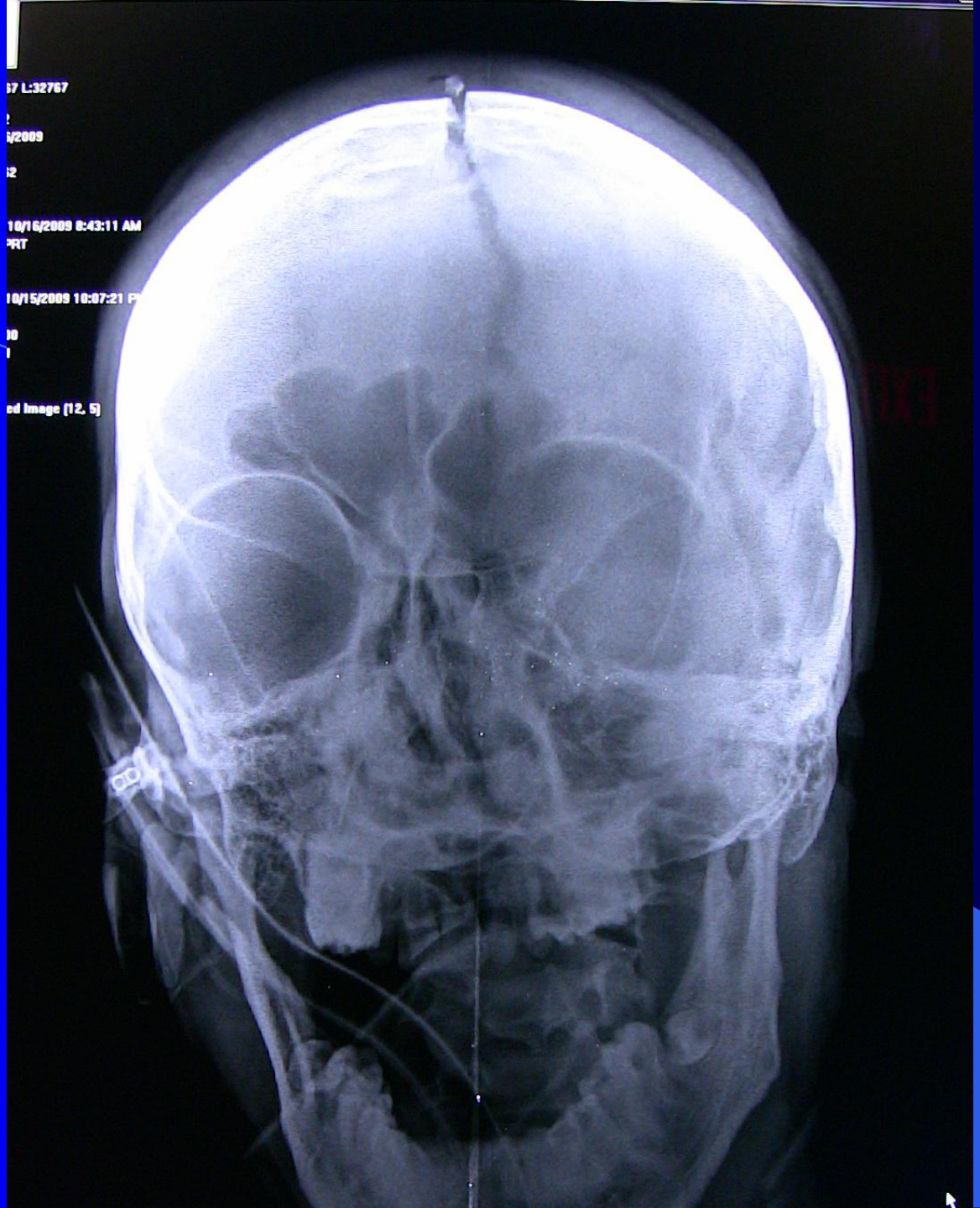
CELOX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MANAGEMENT OF PATIENTS WITH SEVERE HEAD TRAUMA

Original Release/Approval		3 Mar 2005	Note: This CPG requires an annual review.	
Reviewed:	Jun 10	Approved:	30 Jun 2010	
Supersedes:	Management of Patients with Severe Head Trauma 13 Feb 2009			
X Minor Changes (or)		Changes are substantial and require a thorough reading of this CPG		(or)
Significant Changes				

1. Goal. To provide guidelines and recommendations for the treatment and management of combat casualties with severe head injuries.

2. Background.

   a. Severely head injured patients are those comatose patients with Glasgow Coma Scores (GCS) of < 9.

   b. Currently, definitive neurosurgical care is available at Level III facilities in both Iraq and Afghanistan.

   c. Multiple trends have been observed since 2003, warranting the standardization of care for these casualties.

      1) The mortality of American service members with severe head injuries is 65% for GCS from 3 to 5 and 10% for GCS from 6 to 8.

      2) Of the survivors, progression to independent stateside living is > 40% for GCS from 3 to 5 and 60% for GCS from 6 to 8.

Survivable Traumatic Brain Injury

- Resuscitation, intubate
- Aggressive treatment of hypoxia, hypotension and temperature elevation
- Sedation, paralysis, transport
- 3% NaCl infusion

Joint Theater Trauma System Clinical Practice Guideline

6) Patients with moderate head injury who deteriorate and those with severe head injury should receive 250ml bolus of 3% saline and then infusion of 3% saline at 50-100ml/hr for resuscitation en route to the Level III center. If further deterioration occurs or if the patient shows signs of herniation (pupillary dilation, hypertension and bradycardia, progression to decerebrate posturing) consider using Mannitol 1g/kg bolus IV, followed by 0.25g/kg rapid IV push q4hrs. Note: Do not use Mannitol in hypotensive or under-resuscitated casualties.

f. Antiepileptic medications for seizure prophylaxis:

Use of Magnetic Resonance Imaging (MRI) in Management of Mild Traumatic Brain Injury (mTBI)/Concussion in the Deployed Setting

Original Release/Approval		02 Aug 2011	Note: This CPG requires an annual review.	
Reviewed:	Jul 2011	Approved:	4 Aug 2011	
Supersedes:	This is a new CPG and must be reviewed in its entirety.			
☐ Minor Changes *(or)*		☐ *Changes are substantial and require a thorough reading of this CPG* *(or)*		
☐ Significant Changes				

1. **Goal.** To provide updated guidance for the use of Magnetic Resonance Imaging (MRI) capability in the continuum of care in the diagnosis, evaluation, treatment, follow-up and return to duty of mild traumatic brain injury (mTBI) patients.

2. **Background/Introduction.**

   a. In December 2006, the first mTBI acute management algorithms in military operational settings were released as part of a Clinical Practice Guideline (CPG) document. Since then, several memorandums were released, algorithms have undergone several revisions, and more research has been done. Last updated version was 21 Nov 2008 at the request of Joint Theater Trauma System (JTTS) and CENTCOM leaders. The terms mTBI and concussion are used interchangeably in the literature, and for the purpose of consistency, concussion is used throughout these recommendations.

   b. On June 21, 2010, Directive Type Memorandum (DTM) 09-033, "Policy Guidance for Management of Concussion/Mild Traumatic Brain Injury in the Deployed Setting" was signed by the Deputy Secretary of Defense. This For Official Use Only (FOUO) document was established to address battlefield concussion, a major deployment concern of the military. The

Joint Theater Trauma System Clinical Practice Guideline

PELVIC FRACTURE CARE

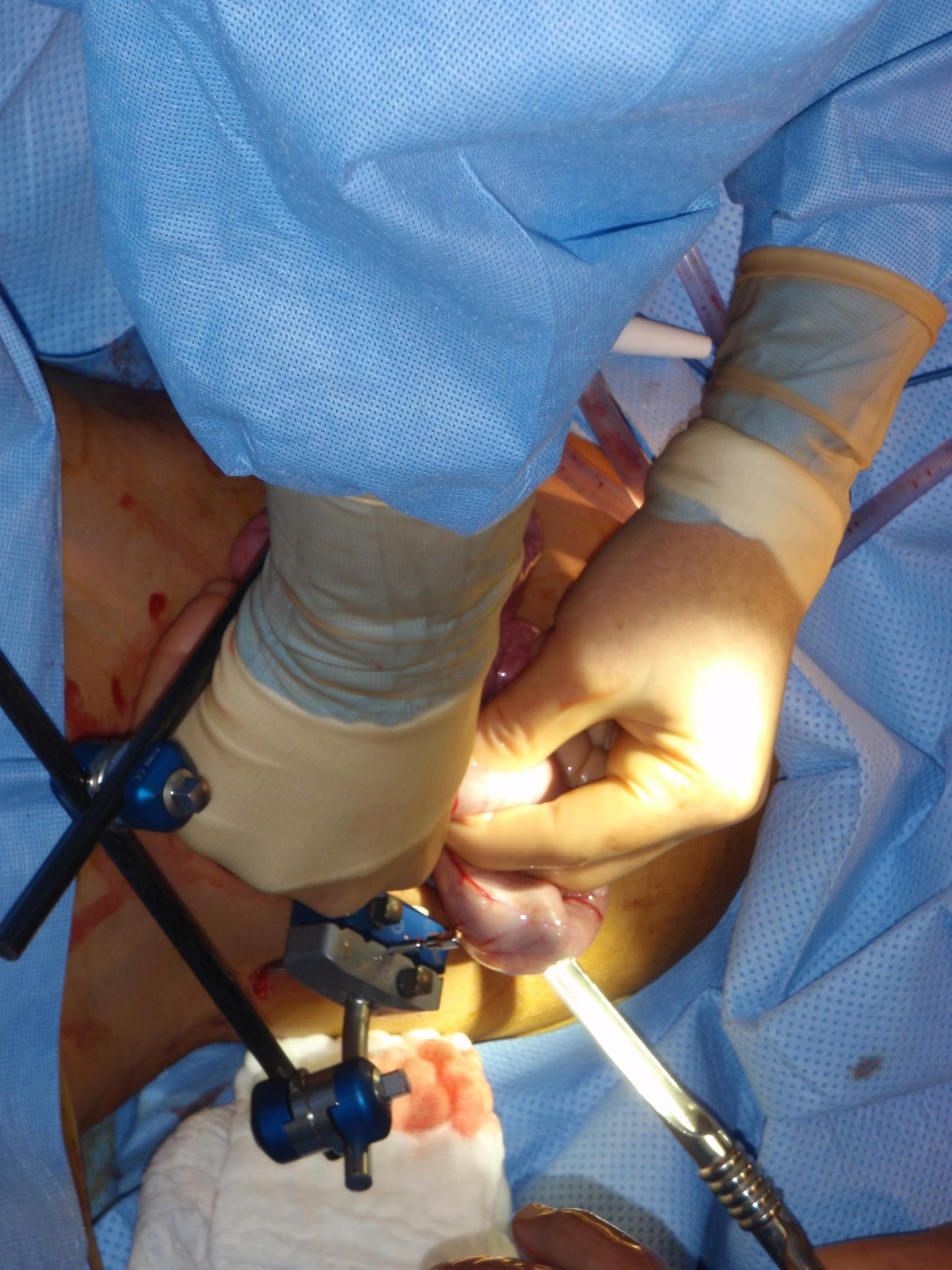
Original Release/Approval		18 Dec 2004	Note: This CPG requires an annual review.	
Reviewed:	Jun 2010	Approved:	30 Jun 2010	
Supersedes:	Pelvic Fracture Care, 12 Nov 2008			
☐ Minor Changes *(or)*	☒ *Changes are substantial and require a thorough reading of this CPG* *(or)*			
☐ Significant Changes				

1. Goal. To provide a brief review for the stabilization and treatment of pelvic fractures sustained in combat casualties.

2. Background.

a. Historically, injuries to the pelvis were relatively uncommon in the combat environment. The prevalence of Improvised Explosive Device (IED) attacks seen in the Iraq and Afghanistan operations against technologically improved tactical vehicles has led to an increased incidence of blunt trauma pelvic injuries.

b. Hemodynamically compromised patients with pelvic fractures present a complex challenge to the trauma team as fractured pelvic bones can induce brisk bleeding and can lacerate surrounding soft tissues. Furthermore, pelvic fractures often occur in conjunction with other life threatening injuries. Civilian mortality rates have ranged from 18% to 40%. Death within the first 24 hours of injury in these patients is most often a result of acute blood loss.



c. Key issues in management of pelvic fractures are to identify if the patient is hemodynamically stable and if the pelvic fracture is stable. If the patient is not hemodynamically stable it is imperative to identify all site(s) of hemorrhage as pelvic fractures often occur in conjunction with other life threatening injuries. **Appropriate evaluation of the abdomen, chest, and other potential sites of injury and hemorrhage cannot be overstressed.** Additionally, a thorough examination of the pelvis and perineum is required to rule out associated injuries to the rectum and GU/GYN systems.

d. When pelvic fractures cause hemorrhage the bleeding occurs from three major sources; arterial, venous, and cancellous bone. Over 70% of hemorrhage associated with blunt pelvic trauma causing pelvic fracture is venous in nature and may be controlled with maneuvers that reduce the pelvic volume and stabilize the pelvis. The other nearly 30% is associated with an arterial source and often requires procedural interventions such as surgical packing and / or embolization.

e. For pelvic fractures, stabilization with whatever means are available (sheet, bean or sand bags, or pelvic external fixation) must be promptly implemented. In situations where fracture stability is unclear and specialist expertise is not available to determine pelvic fracture stability, stabilization with a sheet or binder is recommended until further guidance is available from a knowledgeable specialist. When possible, correction of lower extremity external rotation by taping the knees and ankles together can improve the pelvic reduction achieved with a sheet or binder.

What is new in blast trauma?

- Maturation of injury recognition
- Amputation
- Blast neurotrauma
- Acoustic injury
- Lung injury
- Bowel injury

Suicide attack in Afghanistan kills 13

November 20, 2009 3:51 a.m. EST

STORY HIGHLIGHTS

- **NEW:** Among the dead was one policeman; attack injured 29 others, including 8 children
- Suicide bomber self-detonated next to the governor's house in the capital, Farah city
- Attack comes day after Afghan President Karzai was sworn in to second term

RELATED TOPICS

Afghanistan
Hamid Karzai
Suicide Attacks

(CNN) -- At least 13 people were killed in a suicide bombing Friday morning in Afghanistan's western Farah province, police said.

Among the dead was one policeman. The attack injured 29 others, including eight children, police said.

The suicide bomber self-detonated next to the governor's house in the capital, Farah city. Police have reason to think the bomber was Pakistani, said Mohammed Faqeer Asker, chief of police in Farah.

The largely desert province bordering Iran has seen an increase in bloodshed as Taliban insurgents have spread west from their strongholds in the south and east of Afghanistan.

The attack occurred a day after Afghan President Hamid Karzai was sworn in for a second five-year term.

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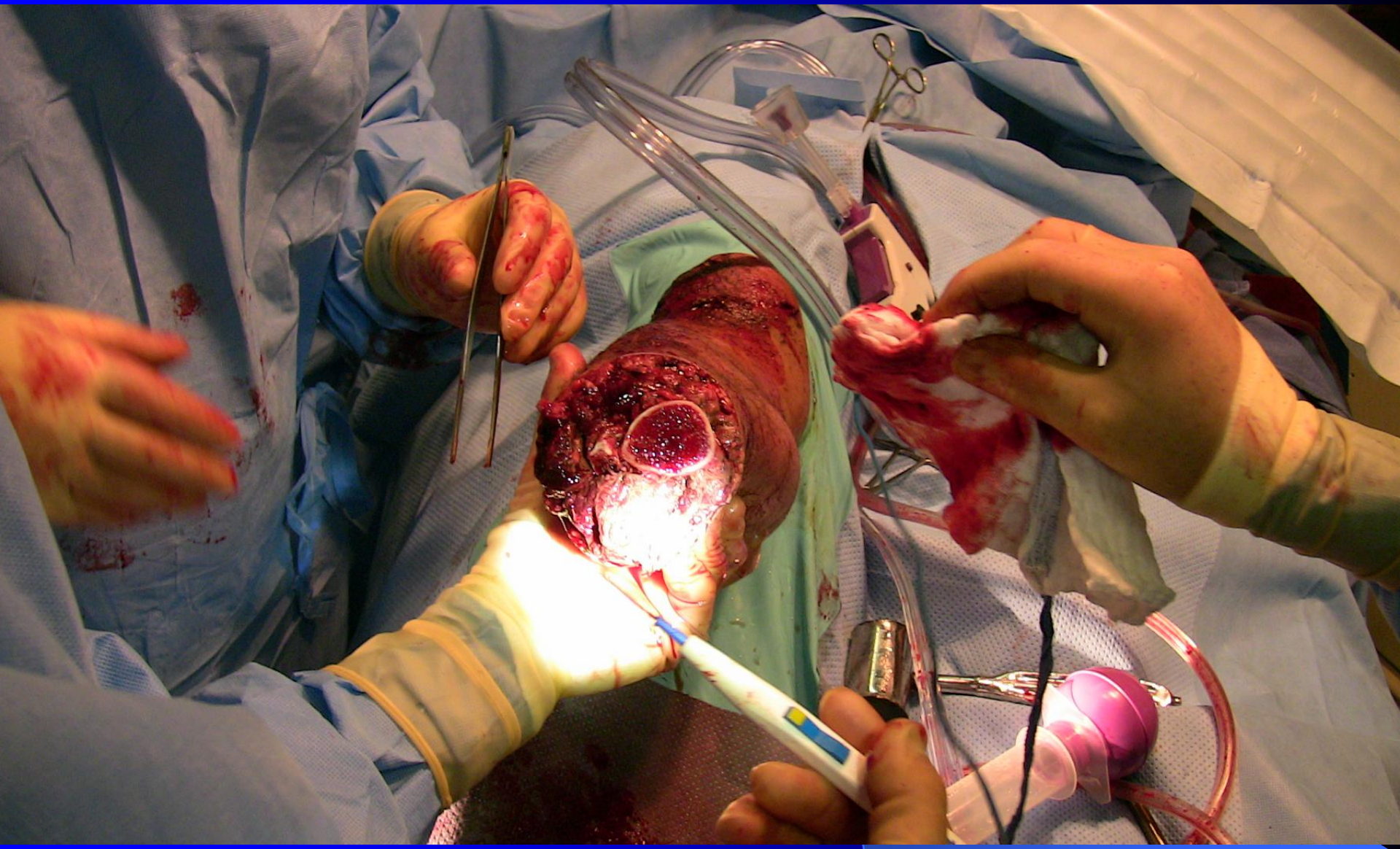
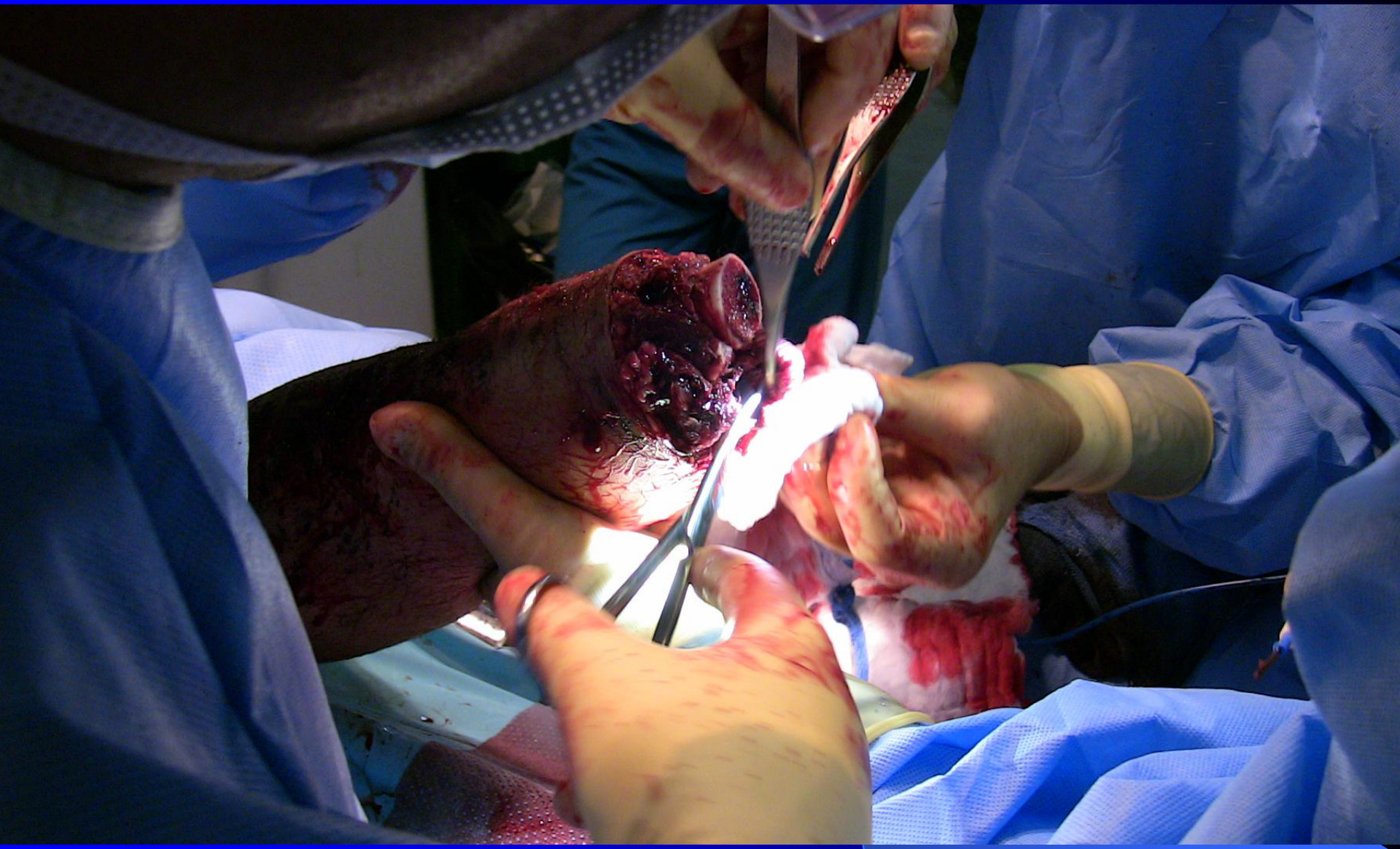




JOURNAL OF NEUROTRAUMA 26:815–825 (June 2009)

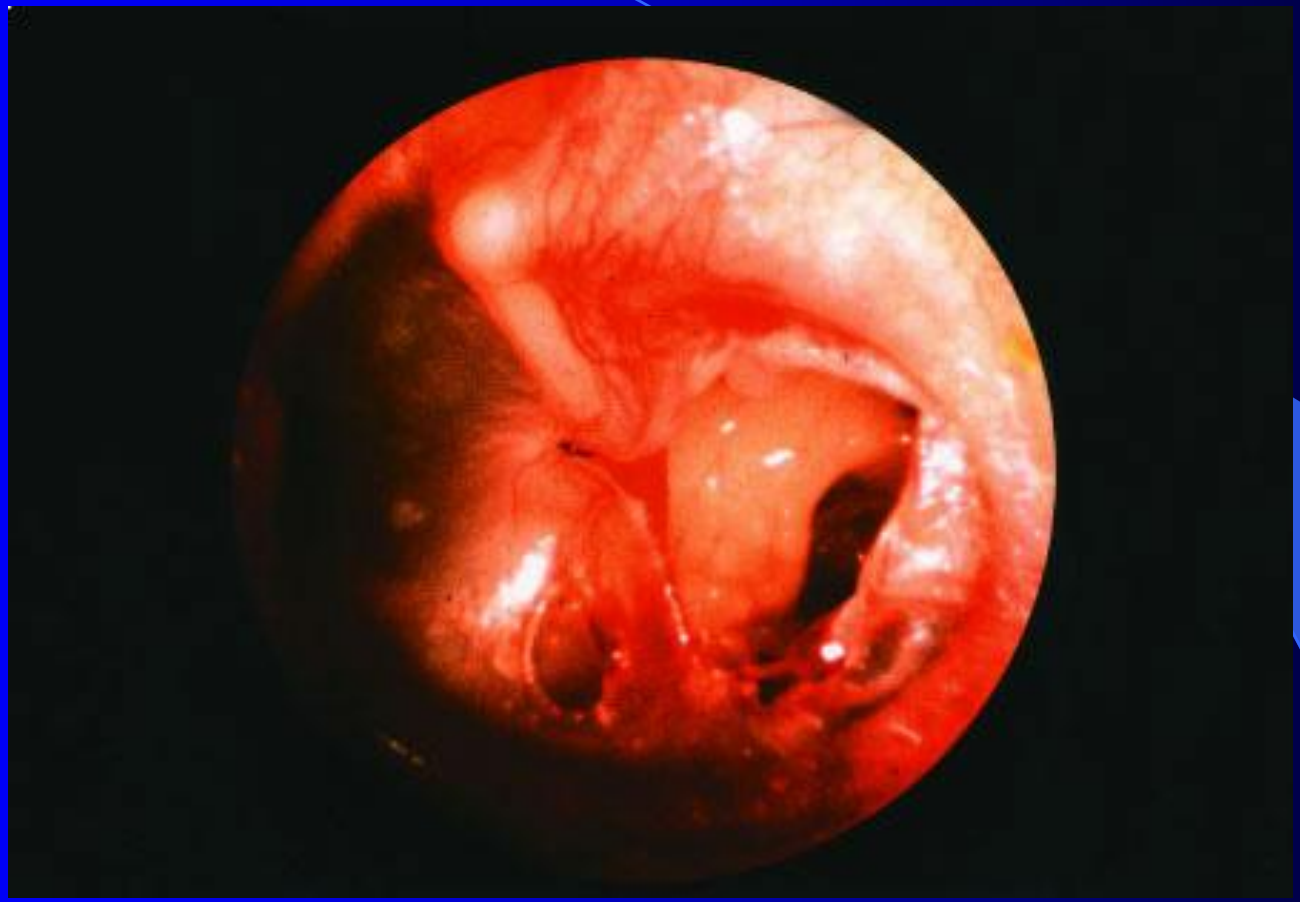
DOI: 10.1089/neu.2007.0484

Explosive Blast Neurotrauma

Geoffrey Ling,[1,2] Faris Bandak,[1,5] Rocco Armonda,[2] Gerald Grant,[3] and James Ecklund[2,4]

Abstract

Explosive blast traumatic brain injury (TBI) is one of the more serious wounds suffered by United States service members injured in the current conflicts in Iraq and Afghanistan. Some military medical treatments for blast TBI that have been introduced successfully in the war theater include decompressive craniectomy, cerebral angiography, transcranial Doppler, hypertonic resuscitation fluids, among others. Stateside neurosurgery, neurocritical care, and rehabilitation for these patients have similarly progressed. With experience, military physicians have been able to clinically describe blast TBI across the entire severity spectrum. One important clinical finding is that a significant number of severe blast TBI victims develop pseudoaneurysms and vasospasm, which can lead to delayed decompensation. Another is that mild blast TBI shares clinical features with post-traumatic stress disorder (PTSD). Observations suggest that the mechanism by which explosive blast injures the central nervous system may be more complex than initially assumed. Rigorous study at the basic science and clinical levels, including detailed biomechanical analysis, is needed to improve understanding of this disease. A comprehensive epidemiological study is also warranted to determine the prevalence of this disease and the factors that contribute most to the risk of developing it. Sadly, this military-specific disease has significant potential to become a civilian one as well.

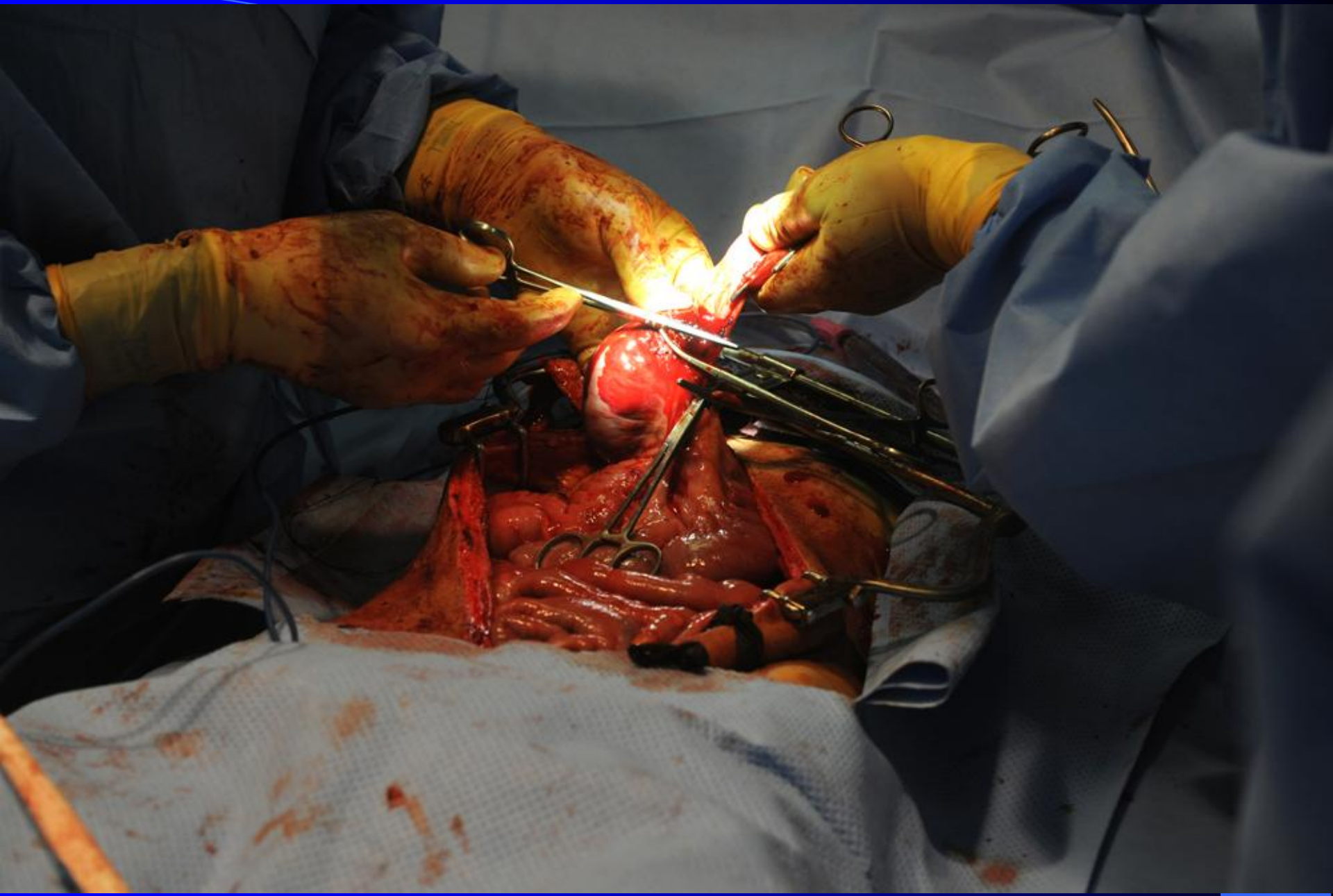


Delayed Blast Effects

- Blast Lung injury – Direct consequence of overpressure blast wave. Most common fatal among initial blast injury survivors.
- Early - Hemothorax, pneumothorax, pulmonary contusion, pulmonary hemorrhage
- Late – Airway epithelial damage, aspiration pneumonitis, sepsis

Delayed Blast Effects

- Blast Gastrointestinal Injury – Direct consequence of overpressure blast wave transmitted to hollow viscus or solid intrabdominal organ.
- Manifests as shock with distended abdomen or delayd peritonitis with sepsis

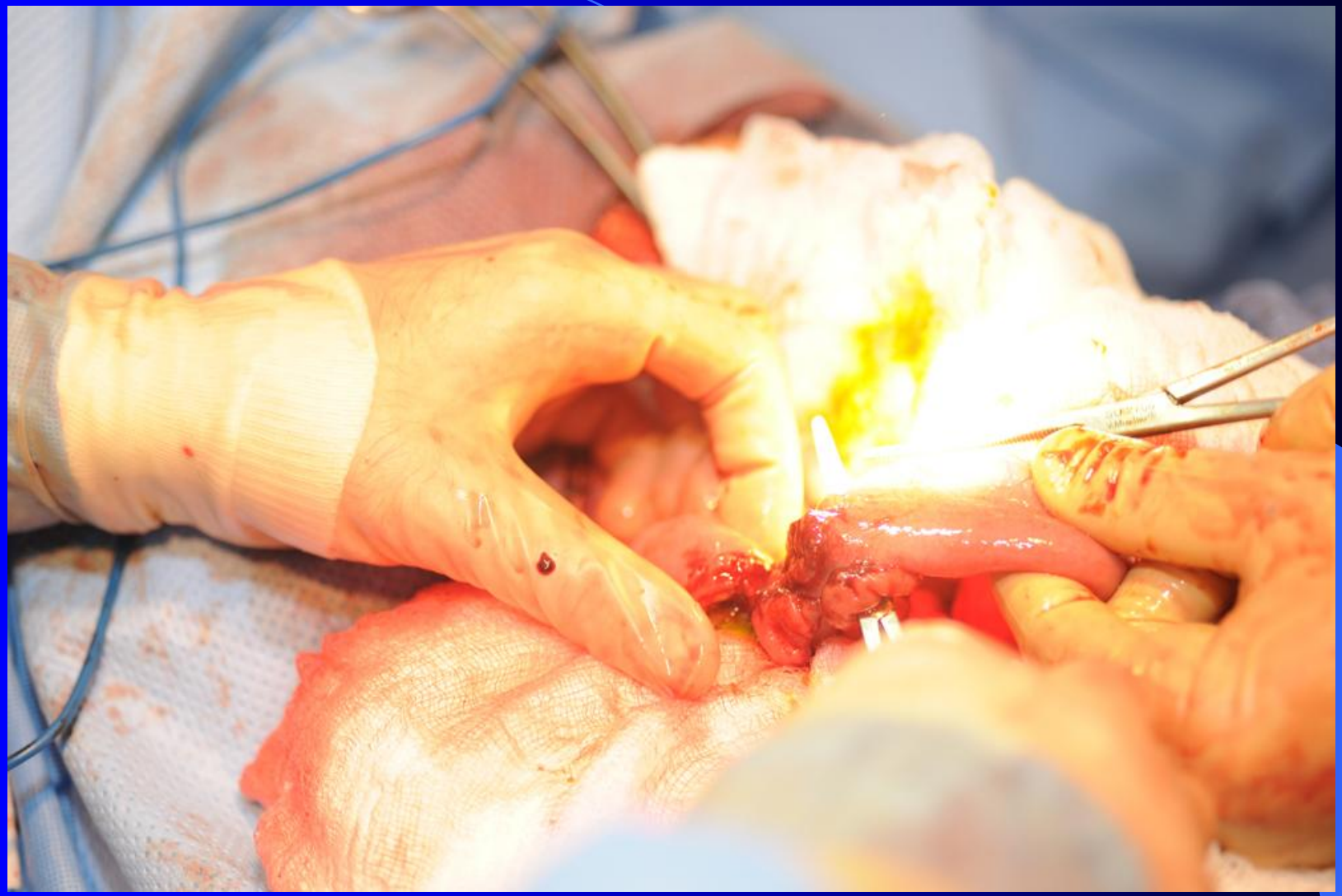


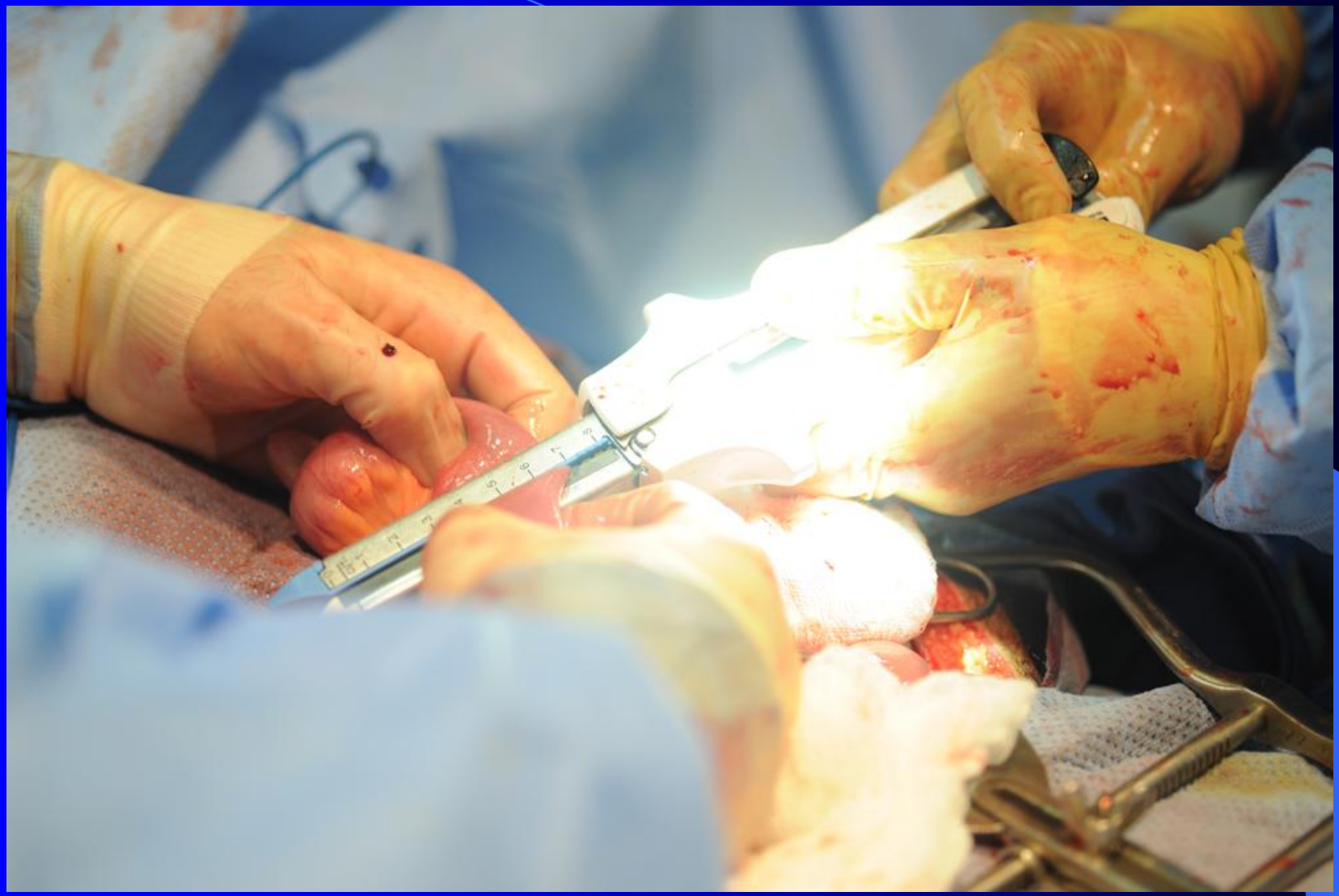
What is new in penetrating trauma?

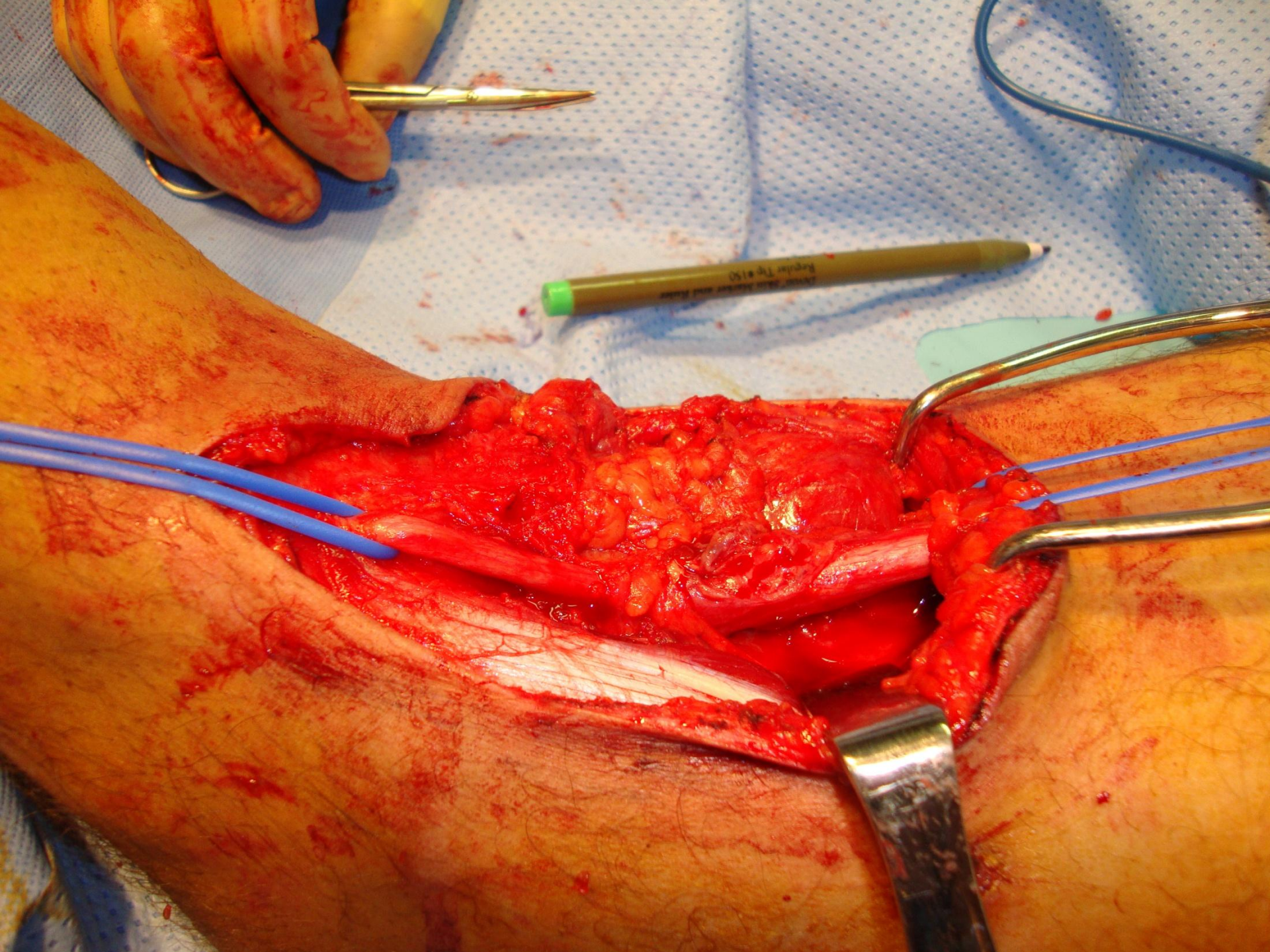
- Resuscitative Surgery
- Vascular Shunts

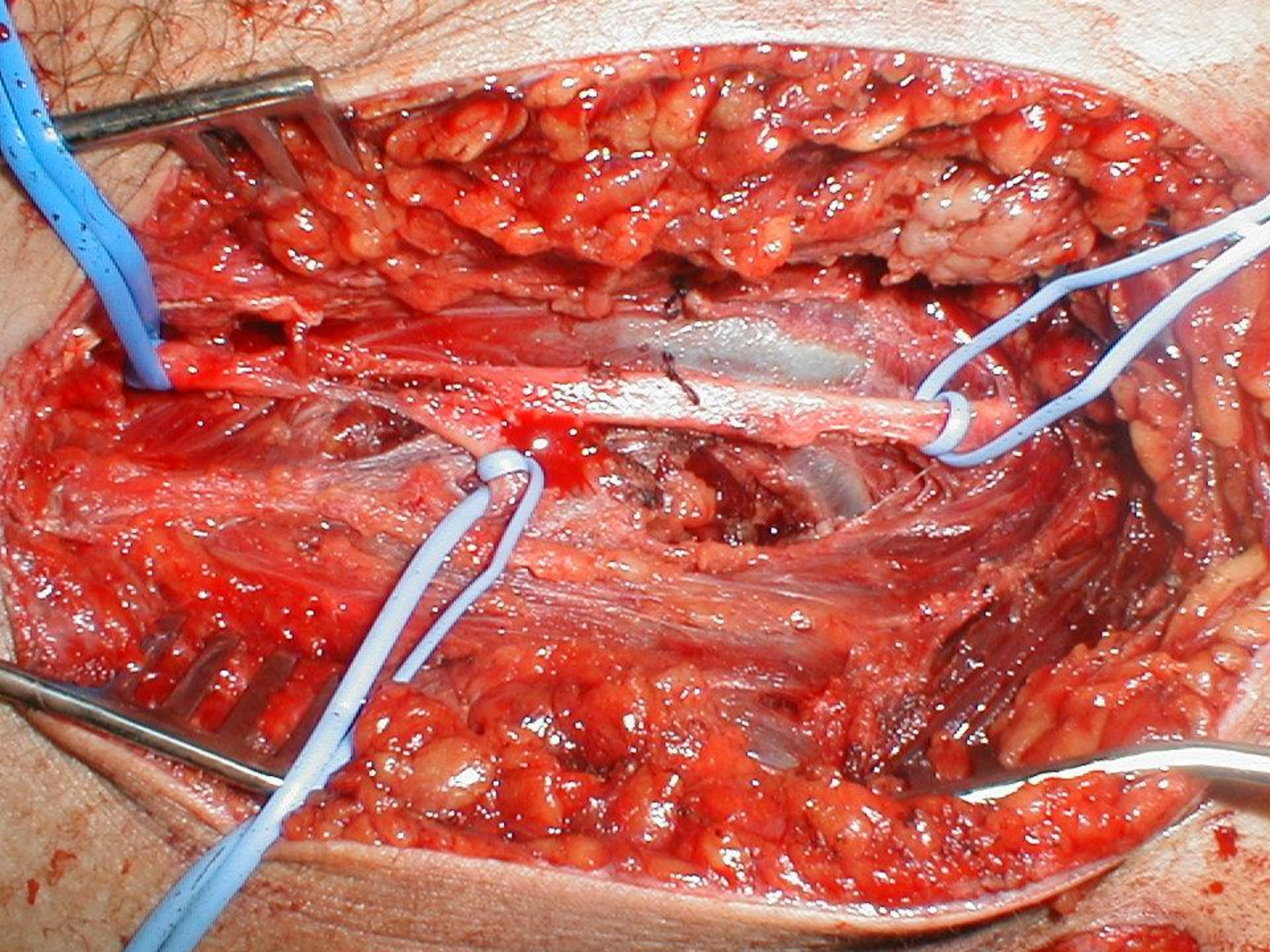
Resuscitative Surgery

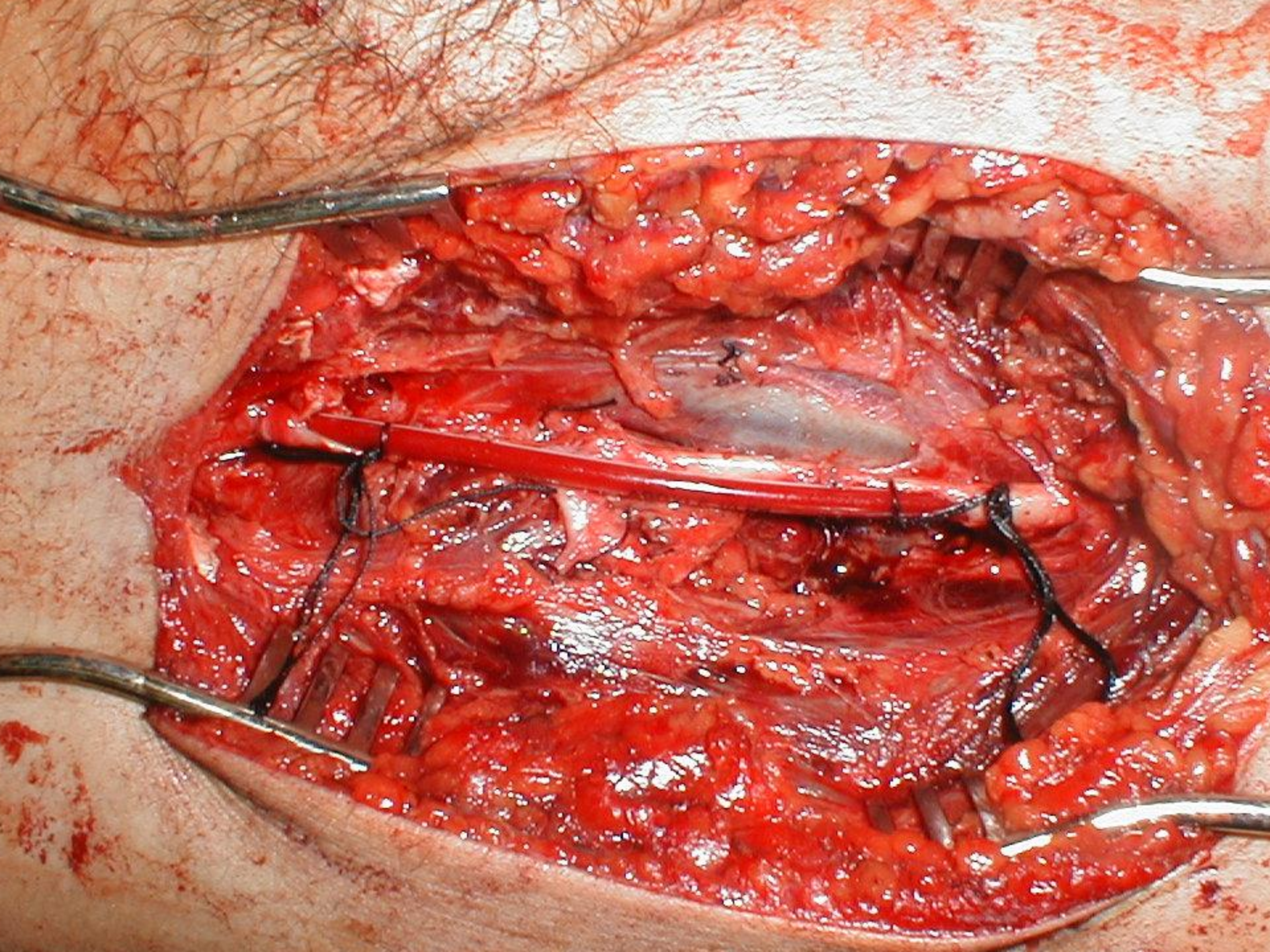
- Stop bleeding
- Stop soilage
- Correct physiology rather than anatomy











Non-operative Management

- Solid Organ
- Blunt Trauma
- Penetrating Trauma

Compr Ther. 1991 Apr;17(4):51-6.

Immediate and follow-up management of hepatic trauma.

Feliciano DV.

Department of Surgery, University of Rochester Medical Center, NY 14642.

Abstract

There has been a considerable evolution in the management of patients with hepatic injuries in the past 5-10 years. CT is now the mainstay of diagnosis for stable patients with blunt hepatic injuries. This allows for nonoperative therapy in many patients with lacerations, intrahepatic hematomas, or subcapsular hematomas. Simple operative techniques are used in 60% of patients with blunt injuries, and any deaths in this group are usually due to associated injuries. In patients requiring advanced techniques of repair, postoperative management emphasizes basic techniques including correction of hypothermia and coagulopathies and early use of enteral feeding. Postoperative complications are not rare when Class III, IV, or V hepatic injuries have been treated, but can be managed with the assistance of the interventional radiologist, blood bank, or by use of early reoperation. Mortality depends on mechanism of injury and magnitude of hepatic injury, and ranges from 14-31% for patients with blunt trauma.

PMID: 1879118 [PubMed - indexed for MEDLINE]

Br J Surg. 2012 Jan;99 Suppl 1:155-64. doi: 10.1002/bjs.7735.

Outcome of selective non-operative management of penetrating abdominal injuries from the Nort American National Trauma Database.

Nabeel Zafar S, Rushing A, Haut ER, Kisat MT, Villegas CV, Chi A, Stevens K, Efron DT, Zafar H, Haider AH.

Department of Surgery, Aga Khan University, Karachi, Pakistan.

Abstract

BACKGROUND: The aim of this study was to investigate trends in the practice of selective non-operative management (SNOM) for penetrating abdominal injury (PAI) and to determine factors associated with its failure.

METHODS: The National Trauma Data Bank for 2002-2008 was reviewed. Patients with PAI were categorized as those who underwent successful SNOM (operative management not required) and those who failed SNOM (surgery required more than 4 h after admission). Yearly rates of SNOM versus non-therapeutic laparotomy (NTL) were plotted. Multivariable regression analysis was performed to identify factors associated with failed SNOM and mortality.

RESULTS: A total of 12 707 patients with abdominal gunshot and 13 030 with stab wounds were identified. Rates of SNOM were 22.2 per cent for gunshot and 33.9 per cent for stab wounds, and increased with time ($P < 0.001$). There was a strong correlation between the rise in SNOM and the decline in NTL ($r = -0.70$). SNOM failed in 20.8 and 15.2 per cent of patients with gunshot and stab wounds respectively. Factors predicting failure included the need for blood transfusion (odds ratio (OR) 1.96, 95 per cent confidence interval 1.11 to 3.46) and a higher injury score. Failed SNOM was independently associated with mortality in both the gunshot (OR 4.48, 2.07 to 9.70) and stab (OR 9.83, 3.44 to 28.00) wound groups.

CONCLUSION: The practice of SNOM is increasing, with an associated decrease in the rate of NTL for PAI. In most instances SNOM is successfu however, its failure is associated with increased mortality. Careful patient selection and adherence to protocols designed to decrease the failure rate of SNOM are recommended.

Comment in

Br J Surg. 2012 Jan;99 Suppl 1:164-5.

PMID: 22441871 [PubMed - indexed for MEDLINE]

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Has the Trauma Surgeon Become House Staff for the Surgical Subspecialist?

David J Ciesla, MD, Ernest E Moore, MD, C Clay Cothren, MD, Jeffery L Johnson, and Jon M Burch, MD

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Summary

Go to:

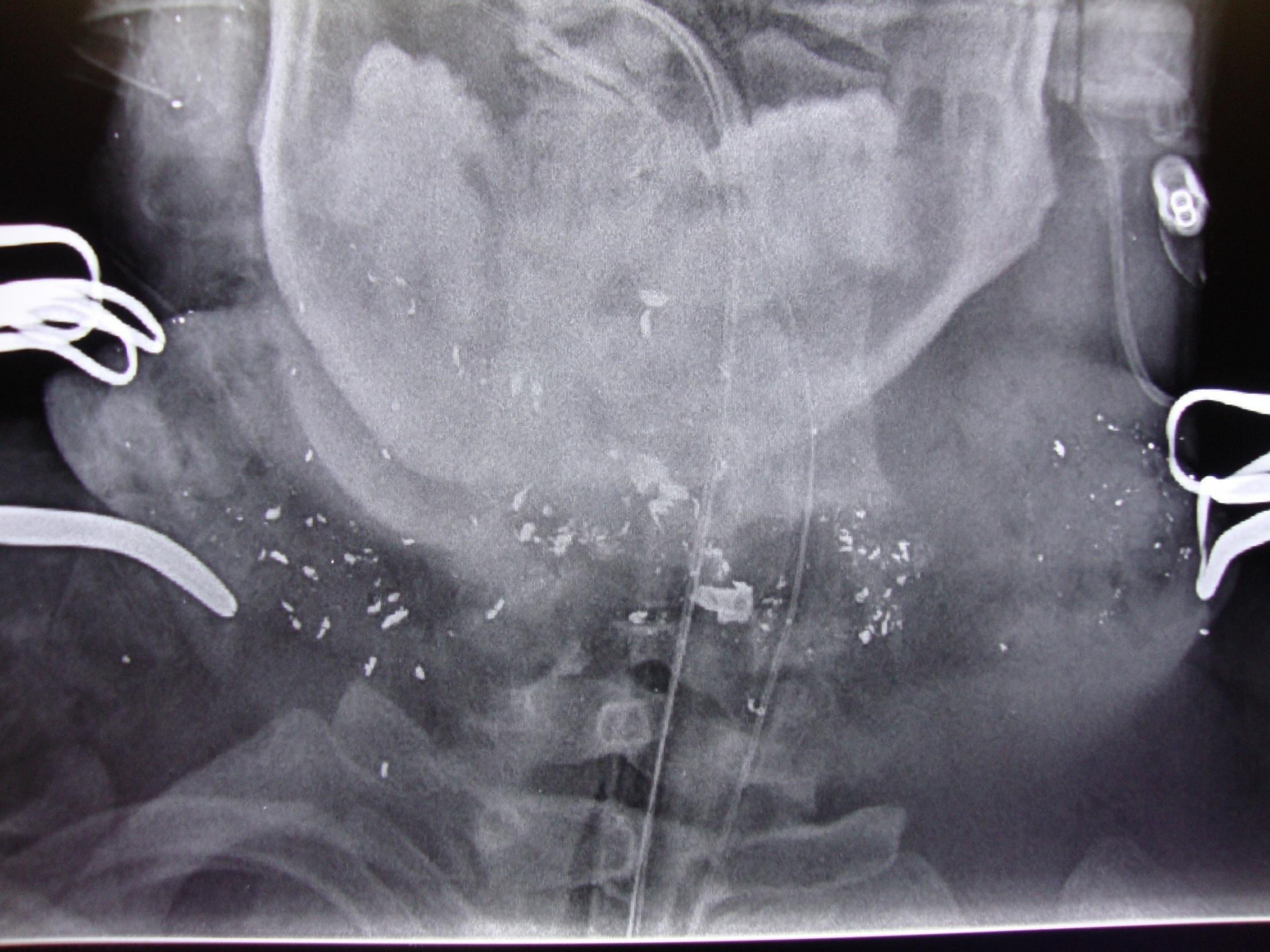
The general surgeon's growing disinterest in trauma is fueled by lack of surgical opportunity and high burden of non operative responsibilities. The majority of care provided by the trauma surgeon supports other procedure oriented specialties. This is a major deterrent surgeon participation in trauma care and must be addressed in the evolution of the Acute Care Surgeon.

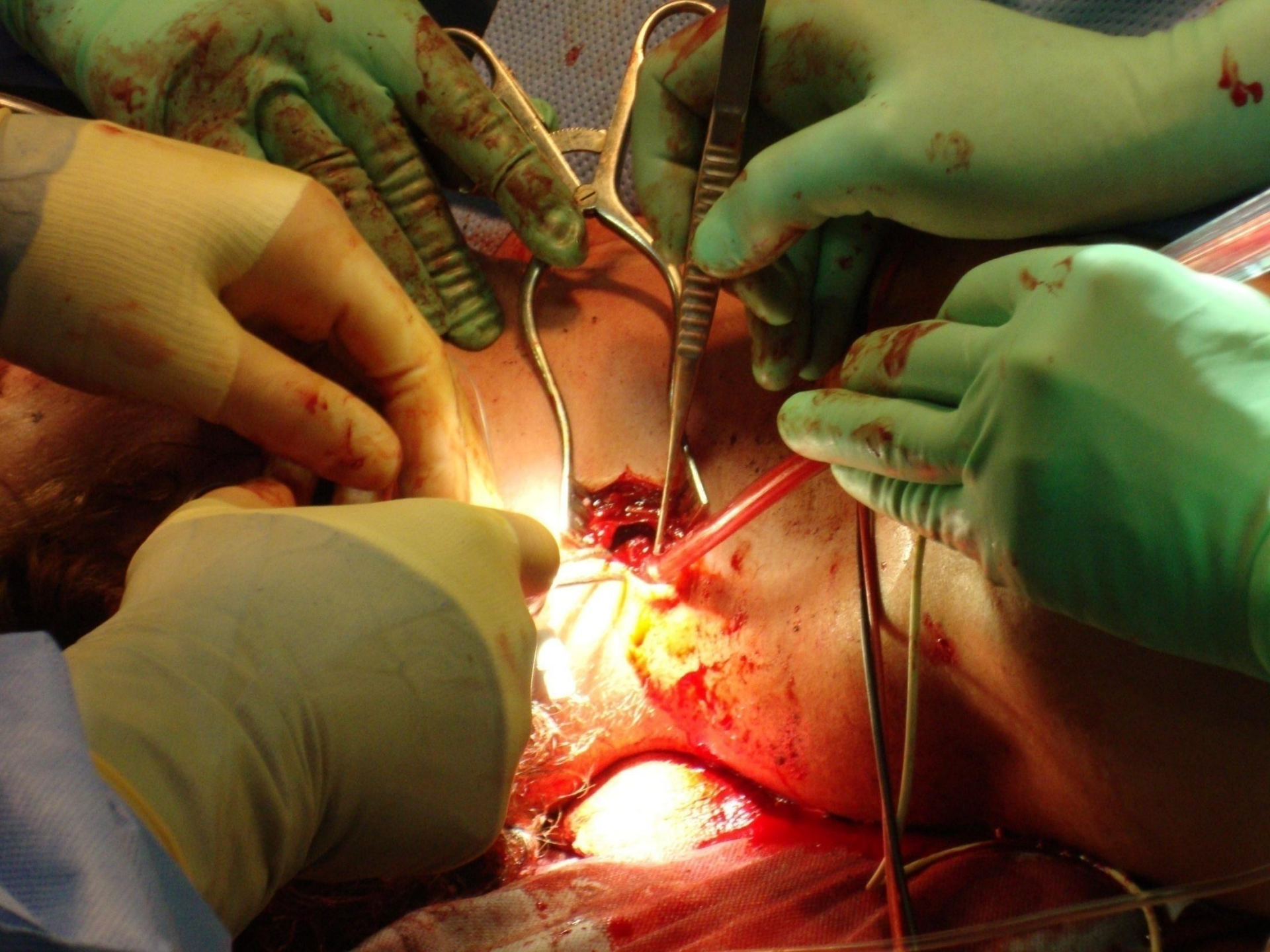
Background

The role of the trauma surgeon is perceived to be mostly supportive of other procedure oriented specialties. We designed this study to characterize the operative and nonoperative responsibilities of the contemporary trauma surgeon.

Methods

Trauma patients admitted to an urban academic Level I Trauma Center were studied using trauma registry data for 2004.





Future of Civilian Trauma?

- Blunt and Non Hypotentsive Penetrating Trauma = Managed by special internists and interventional radiolodists
- Hypotensive Blunt or Penetrating Trauma = Managed by Trauma Surgeons